

Claims Rejections – 35 U.S.C. §112

The Examiner has rejected claims 70, 72 and 73 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. These claims have been deleted. As such, the rejections under 35 U.S.C. §112 are moot.

Claims Rejection – 35 U.S.C. §103(a)

The Examiner has rejected the remaining claims under 35 U.S.C. §103(a) as being anticipated by Palmberg, in view of Keshevan or Hedlund, Skidmore in view of Keshevan or Hedlund, and Isakov, in view of Keshevan or Hedlund. Applicants respectfully traverse these rejections.

Applicants submit that none of the references cited references, alone or in combination, teach the use of second inserts with a larger contact area enhanced with superhard material. The “larger” second inserts shown in Palmberg, Isakov, and Skidmore do not disclose larger contact areas. The contact area of an insert is influenced by a number of factors, including an insert’s diameter and profile; however, both diameter and profile independently influence the resulting contact area. A small diameter insert’s contact area is not necessarily less than a larger diameter insert’s contact area. For instance, an insert with a small diameter and relatively flat profile (i.e. a profile with a larger radius of curvature) would result in a certain contact area. A larger diameter insert having a more hemispherical profile (i.e. a profile with a smaller radius of curvature) can have the same said certain contact area. In other words, inserts with different diameters, and with different profiles, may have equivalent contact areas. The cited references disclose inserts of differing diameters and profiles, but not the corresponding relationship of the inserts’ contact areas.

Applicants discovered that increasing the contact area of the second inserts could reduce stresses. The use of such an insert would not be obvious to one skilled in the art. Generally, as an insert’s profile flattens, the protrusion of the insert into the formation is reduced, also reducing the overall rate of penetration. In other words, increasing the insert’s radius of curvature (and/or the inserts contact area) results in a seemingly dull insert. One skilled in the art

would expect a corresponding reduction in the bit's rate of penetration. However, Applicants discovered that their combination of differently sized and shaped diamond inserts results in a superior transfer of load when using superhard inserts on percussion bits, without sacrificing the rate of penetration.

The desire to increase (or in any way manipulate) contact areas to resolve problems associated with inserts enhanced with superhard material is not suggested in any of the cited references. As previously argued and as recognized in the art, enhancing an insert with superhard material increases an insert's wear resistance, but associated stresses often result in premature bit failures. Applicants discovered that increasing the contact area of the second inserts reduce these stresses, extends bit life, and thus, results in a superior rate of penetration and increased footage drilled. No reference cited by the Examiner, alone or in combination, provides motivation to use second inserts with a larger contact area enhanced with superhard material, as claimed.

As shown above, the use of a drill bit with inserts of the size, shape and configuration claimed solves previously unresolved technical problems. Applicants submit that claims 1, 26, and 50 are patentably distinguishable from the cited references. Claims 2-25, 27-49, 51-69, and 71 are dependent on claims 1, 26, and 50. Therefore, the allowability of these claims is also asserted based on the above arguments.

During the course of these remarks, Applicant has at times referred to particular limitations of the claims that are not shown in the applied prior art. This short hand approach to discussing the claims should not be construed to mean that the other claimed limitations are not part of the claimed invention. They are as required by law. Consequently, when interpreting claims, each of the claims should be construed as a whole, and patentability determined in light of this required claim construction.

Reconsideration of the claims and the allowance thereof is respectively requested. Applicants respectfully suggest that the application has been placed in condition for allowance. Should the Examiner have any questions regarding the foregoing, please do not hesitate to contact the undersigned.

Respectfully submitted,

A handwritten signature in cursive script, reading "Sean Henkel". The signature is written in dark ink and is positioned above a horizontal line.

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